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Scrutiny of factors affecting extraction distances of forwarders

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Forest mechanization started with the extraction work, which led to the current forwarders and skidders. The mean extraction distance is of key interest in predictions of time needed and the related costs for the extraction operation in a given stand. The most commonly used model for predicting mean extraction distances in forwarding is to take the straight line distance from the volume centre of the stand to the landing, and eventually adding a certain percentage due to the incapacity to drive as the bird flights. Thus, the model assumes straight line extraction from all points in the stand. That kind of extraction pattern might be possible in clear-cuts, although seldom implemented, but is impossible in thinnings. Nevertheless, the model is used indiscriminately as a standard for all kind of forwarding. The method is indeed simple to use, but has recently been proven highly inaccurate in specific stands. Thus, we theoretically evaluated how the extraction distance was influenced by the size, shape and density of the stand, as well as of the size of the forwarder's payload, the striproad network and the location of the landing. The analysis reveals that all of these factors have considerable influence on the mean extraction distance. This systematic evaluation will serve as a steppingstone to more accurate predicting models, which will enable better management and planning of the mechanized CTL forest operations. Moreover, more accurate predictions of forwarding extraction distances will also enable better decisions on whether or not to build forest roads.